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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 09-866843	Applicant(s) Ogure et al
Examiner George Goudreau	Group Art Unit 1763

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on (5-01' to 8-01')(i.e., - papers #1-4)
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-20 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-20 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some ☒ None of the:

- ☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: none of the certified copies have been received.

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☐ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other _____

Office Action Summary

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by
Hatakeyama et. al. (5,883,470).

Hatakeyama et. al. disclose a process, and apparatus for etching a wafer using a FAB to treat the surface of the substrate in the presence of a HCl ambient gas. The FAB is comprised of a cylindrical tube (21) in which a plasma is generated using an RF inductively coupled coil (25) which surrounds the plasma generation tube. DC biased, porous electrodes (29, 30) are used to cap each end of the tube. A FAB is formed when positive ions in the gas are accelerated toward the negative electrode (30). The positive electrode (29) is optimally spaced 15 mm from the negative electrode (30). The electrode plates (29, 30) have a diameter of 15 mm (i.e.- the internal diameter of the tube). Thus, there is a 1.0/1.0 ratio between these two quantities. This is discussed specifically in column 4-6; and discussed in general in columns 1-10. This is shown in figures 1-4.

3. Claims 1-2, 13, and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by
Hatakeyama (5,708,267).

Hatakeyama discloses a process for etching a pattern in the surface of a substrate using a FIB in the presence of an additional energy source while exposing the substrate to a processing gas. The substrate to be etched may be any of a wafer, a semiconductor, a metal, or an insulator. The additional energy source used to irradiate the substrate while simultaneously treating the surface of the substrate with a FIB may be any of x-rays, a laser (i.e.-UV light), an ion beam, or an electron beam. The processing gas used to treat the substrate may be any of fluorine,

chlorine, or O₂. The substrate may be rotated under a moveable mask during the etching step. This is discussed in columns 1-8. This is shown in figures 1-9.

4. Claims 1-3, 13, and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Hatakeyama et. al. (5,868,952).

Hatakeyama et. al. disclose an apparatus, and a process for either etching or coating of a substrate to form a pattern on the surface of the substrate using a FAB in the presence of a process gas. An additional energy source such as UV light (i.e.-a laser beam) may be used to enhance the rate of processing of the substrate. A mask may be additionally used to facilitate the patterning of the substrate by controlling which regions of the substrate surface are exposed to the FAB. During the processing of the substrate, either the work piece support or the FAB may be rotated relative to each other in order to ensure more uniform processing of the substrate. This is discussed in columns 1-32. (Please note especially the abstract, and column 11.) This is shown in figures 1-121.

5. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Folch et. al. (1996').

Folch et. al. disclose a process for selectively coating a Si wafer with Au using EBD (i.e.-electron beam deposition) of Au. They selectively irradiate the Si wafer with an electron beam in the presence of an organometallic precursor gas which contains Au in its structure in order to cause Au to be deposited onto the Si wafer. This is discussed on pages 2609-2613. This is shown in figures 1-5.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 19-20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakeyama et. al. as applied in paragraph 2 above.

Hatakeyama et. al. as applied in paragraph 2 above fail to specifically disclose the following aspects of applicant's claimed invention:

- the specific usage of anode, and cathode electrodes in the FAB apparatus which have the specific diameter which is claimed by the applicant; and
- the specific spacing of anode, and cathode plates in the FAB beam apparatus which is claimed by the applicant

It would have been prima facie obvious to employ any of a variety of FAB electrode diameters, and FAB electrode spacings in the apparatus which is taught above including those which are specifically claimed by the applicant. These are all well known variables in the FAB

processing art which are known to effect both the rate and quality of the FAB process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific FAB electrode spacing, and the specific FAB electrode diameter which is claimed by the applicant based upon In re Aller as cited below.

“Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, these are all results effective variables whose values are known to effect both the rate, and the quality of the FAB process. Also, Hatakeyama et. al. teach that the electrodes in their FAB apparatus may be 15 mm in diameter which is close to applicant's claimed limit of 14 mm. Further, they teach that their FAB electrodes may be spaced between (5-100) mm apart from each other with an optimal spacing of 15 mm.

9. Claims 4, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over either of the references as taught in paragraphs 4-5 above.

The references as applied in paragraphs 4-5 above fail to disclose the following aspects of applicant's claimed invention:

- the specific processing parameters which are claimed by the applicant; and
- the usage of EBD to deposit Cu onto a Si wafer

It would have been obvious to one skilled in the art to employ a EBD to deposit Cu onto Si in either of the processes taught above based upon the following. The deposition of Cu onto Si is conventional or at least well known in the semiconductor processing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for depositing Cu onto Si to the specific usage of other such means

for doing such. Further, the references taught above generically teach the usage of their processes for depositing coatings onto substrates.

It would have been prima facie obvious to employ any of a variety of different processing parameters in either of the CVD processes taught above including those which are specifically claimed by the applicant. These are all well known variables in the coating art which are known to effect both the rate and quality of the coating process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific process conditions which are claimed by the applicant in the process taught above based upon In re Aller as cited below.

“Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the coating process.

10. Claims 5-12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.


- The usage of the term "predetermined" in the claims is vague, and indefinite.;
- In the claims, the phrase "from a group consisting of" should be replaced with the phrase "from the group consisting of" in order to be proper Markush claim language.; and
- The wording used in the second paragraph of claim 15 is very confusing, and should be reworded. (The examiner is having difficulty determining which gas or gasses applicant is referring to.)

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.


George A. Goudreau/gag
Primary Examiner

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